

REMARKS/ARGUMENTS

Claims 2-19 are pending in this application. By this Amendment, Applicants amend Claims 2, 8, and 14-16, cancel Claim 1, and add new Claims 17-19.

Claims 1, 14, and 15 were rejected under 35 U.S.C. § 102(b) as being anticipated by Hagstrom et al. (U.S. 6,185,434). Claims 2-6 and 8-12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hagstrom et al. in view of Smith (U.S. 6,724,278). Claims 7 and 13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hagstrom et al. in view of Smith, and further in view of Uchikoba (U.S. 6,628,178). Claim 16 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Hagstrom et al. Claim 1 has been canceled. Applicants respectfully traverse the rejections of Claims 2-16.

Claim 2 has been amended to recite:

A multiplexer comprising:  
a first filter that passes a signal in a first frequency band and attenuates a signal in a second and a third frequency bands;  
a second filter that passes a signal in the second frequency band and attenuates a signal in the first and third frequency bands;  
a third filter that passes a signal in the third frequency band and attenuates a signal in the first and second frequency bands; and  
**a multilayer substrate; wherein**  
the first filter is a lowpass filter, the second filter is a bandpass filter, the third filter is a highpass filter, and one of two input/output ports of each of the first, second and third filters is connected together with a common port;  
**at least one element of the first and third filters is disposed on a mounting surface of the multilayer substrate;**  
**the remaining elements of the first and third filters are disposed on at least one interior layer of the multilayer substrate;**  
**and**  
**the second filter includes a SAW filter disposed on the mounting surface of the multilayer substrate. (emphasis added)**

Claim 8 recites features that are similar to the features recited in Claim 2, including the above-emphasized features.

With the unique combination and arrangement of features recited in Applicants' Claims 2 and 8, including the features of "a multilayer substrate," "at least one element of the first and third filters is disposed on a mounting surface of the multilayer substrate," "the remaining elements of the first and third filters are disposed on at least one interior layer of the multilayer substrate," and "the second filter includes a SAW filter disposed on the mounting surface of the multilayer substrate," Applicants have been able to provide a small-sized low-cost multiplexer (see, for example, the first full paragraph on page 5 of the originally filed specification).

The Examiner alleged that Hagstrom et al. teaches all of the features recited in Claims 2 and 8 (which have been rewritten in independent form including all of the features recited in originally filed Claim 1), except for a SAW filter. The Examiner further alleged that Smith teaches a SAW filter in a multiplexer. Thus, the Examiner concluded that it would have been obvious "to include a SAW filter as taught by Smith in Hagstrom et al.'s multiplexer in order to provide better isolation." Applicants respectfully disagree.

The Examiner alleged that Hagstrom et al. teaches a multilayer substrate in Fig. 6, wherein at least one element of the first and third filters is disposed on a mounting surface of the substrate, and the remaining elements are disposed on an interior layer. This is clearly incorrect.

Fig. 6 of Hagstrom et al. teaches a substrate 62 which includes **only a single layer**. Element 60 of Hagstrom et al. is an element of the triplex filter 51 that is mounted on the single layer substrate 62, **NOT** a layer of the substrate 62. In fact, element 60 is specifically disclosed as being a dielectric body block having cylindrical holes 61 formed therein such that the dielectric body block 60 of Hagstrom et al. and cylindrical holes 61 formed therein define a resonator.

Furthermore, element 64 is specifically disclosed as being an electrically conductive shield which covers the substrate 62 and the dielectric body block 60, and certainly cannot be fairly construed as a layer of the substrate.

Since Hagstrom et al. fails to teach or suggest any multilayer substrate, Hagstrom et al. clearly fails to teach or suggest the features of “at least one element of the first and third filters is disposed on a mounting surface of the multilayer substrate,” “the remaining elements of the first and third filters are disposed on at least one interior layer of the multilayer substrate,” and “the second filter includes a SAW filter disposed on the mounting surface of the multilayer substrate” as recited in Applicants’ Claim 2, and the features of “all elements of the first and third filters are disposed on at least one interior layer of the multilayer substrate” and “the second filter includes a SAW filter disposed on a mounting surface of the multilayer substrate” as recited in Applicants’ Claim 8.

The Examiner further alleged that the motivation to combine the teaching of Smith with Hagstrom et al. would have been to provide better isolation. Applicants respectfully disagree.

Neither Hagstrom et al. nor Smith teaches or suggests that a SAW filter provides better isolation than the resonator disclosed in Hagstrom et al. In fact, Hagstrom et al. and Smith are completely silent with respect to relative amounts of isolation that are produced by the multiplexer of Hagstrom et al. or by the duplex filter of Smith.

The Examiner is reminded that obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. In re Geiger, 815 F.2d 686, 2 USPQ 1276, 1278 (Fed. Cir. 1987). Neither Hagstrom et al. nor Smith provides any teaching, suggestion, or incentive supporting the combination thereof. Accordingly, Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness in the rejection of Claim 2 over Hagstrom et al. in view of Smith.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of Claims 2 and 8 under 35 U.S.C. § 103(a) as being unpatentable over Hagstrom et al. in view of Smith.

The Examiner relied upon Uchikoba to allegedly cure deficiencies of Hagstrom et al. and Smith. However, Uchikoba clearly fails to teach or suggest the features of “a multilayer substrate,” “at least one element of the first and third filters is disposed on a mounting surface of the multilayer substrate,” “the remaining elements of the first and third filters are disposed on at least one interior layer of the multilayer substrate,” and “the second filter includes a SAW filter disposed on the mounting surface of the multilayer substrate” as recited in Applicants’ Claim 2, and the features of “all elements of the first and third filters are disposed on at least one interior layer of the multilayer substrate” and “the second filter includes a SAW filter disposed on a mounting surface of the multilayer substrate” as recited in Applicants’ Claim 8. Thus, Applicants respectfully submit that Uchikoba fails to cure the deficiencies of Hagstrom et al. and Smith described above.

Accordingly, Applicants respectfully submit that Hagstrom et al., Smith, and Uchikoba, applied alone or in combination, fail to teach or suggest the unique combination and arrangement of elements recited in Applicants’ Claims 2 and 8.

In view of the foregoing amendments and remarks, Applicants respectfully submit that Claims 2 and 8 are allowable. Claims 3-7 and 9-19 depend upon Claims 2 and 8, and are therefore allowable for at least the reasons that Claims 2 and 8 are allowable.

In view of the foregoing amendments and remarks, Applicants respectfully submit that this application is in condition for allowance. Favorable consideration and prompt allowance are solicited.

To the extent necessary, Applicants petition the Commissioner for a Three-Month Extension of Time, extend to September 11, 2006 (September 9, 2006 falls on a Saturday), the period for response to the Office Action dated March 9, 2006.

Application No. 10/718,798  
September 7, 2006  
Reply to the Office Action dated March 9, 2006  
Page 11 of 11

The Commissioner is authorized to charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1353.

Respectfully submitted,

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